Laser welds for laser IR product

Infrared distance control in the automobile

Laser welding is proving the process of choise to join plastic components of sensitive optical, electronic and electrical devices. As example: an infrared distance control system developed by ADC GmbH, (a Continental Temic subsidiary, located in Lindau, Germany).

To join the housing, cover and the fully equipped carrier of the component, without damaging the sensitive measuring equipment mounted on the carrier, precluded using vibration and heated tool welding, due to the severe vibratory load and high temperatures. Adhesive bonding risked volatile components precipitating on the optical lens system.

"The gentlest joining method was laser welding, with the added advantage of components being entirely free of fuzz," says Frank Krause, plastic parts welding expert for Bayer Polymers.

Fuzz could impair the proper function of the mechanical elements for moving the IR laser used to determine vehicle distances.

Designers chose Pocan KU 1-7625 for the equipment carrier and the housing (which includes a plug connector) and for the weld compatibility of the PC/PBT blend with the polycarbonate Makrolon, from which the cover of the subassembly is made.

With the equipment carrier material, any tendency to distort could affect the importnat alignment of the optical lens system mounted on the carrier and the mechanics for moving the system.

The black cover for the distance control system had to be highly transparent for the IR laser beam to ensure precise distance measurement. The cover is made from a special grade of Makrolon, which appears black in the visible spectrum but allows IR light to pass through it.

The component is laser welded in two steps. First, the laser-transparent cover is welded to the fully equipped carrier, which comprises the laser-absorbing component, to ensure that the laser light is converted to heat and that a layer of melt is formed in the joint zone.

The cover with the attached carrier is then placed in the housing, which is also laser absorbing, and welded to it. The result is highly accurate, tight and, above all, strong welds.

"A particular design challenge in all of this was the weld between the housing and the cover, which with the carrier bears a high mechanical load," says Krause.

The distance control system passed all of the tests required by current standards for components installed in the front of vehicles, including the water immersion, ball impact and vibration tests in a frequency range from 20 to 2,500Hz.

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Technology: Optoelectronics

Watch for the radiance

Radiant Opto-Electronics Taiwan expects dramatic growth in back-light module shipments in '04, rising by 30% to 11m units, up from 8.47m units this year. Breakdown is expected to be 5m units for LCD monitor and 6m to PC notebooks. The company forecasts 800,000 units for the LCD TV market and 60 million units for the small-size LED market in 2004. China's production will contribute 65% of revenues next year, up from 16% this year, exceeding NT$300m for the first time. The Nanjing, Jiangsu factory begins volume production in the 2Q '04, split 3:2 between large and small-size backlight modules.

DARPA funds Nlight Photonics

NLight Photonics Inc, which makes high-power laser diodes, has been awarded a $5m research grant from the Defense Advanced Research Projects Agency. The Washington company is working on improving energy efficiency of laser diodes used in a variety of military applications.

NLight's 60,000ft² manufacturing facility produces lasers for industrial, defence and medical applications.

LEDs at 12mW/sr radiant intensity

Apex Science & Engineering Corp has launched its RIM-xx38 series of infrared receiving LED modules. With high disturbance shielding and wide receiving angle, the LEDs feature 3V-5V drive and 33-, 36-, 38-, or 56kHz carrying frequency range. They offer 10mW/sr to 12mW/sr radiant intensity, 950nm peak wavelength, and 3Vdc forward voltage. Operating between the 40°C to 85°C range, the LEDs have long receive and response range.